

Claims

I claim:

- 1 1.-A compass system to indicate direction faced comprising:
 - 2 a waterproof housing;
 - 3 a mounting mechanism on said housing to engage a part of a
 - 4 headgear worn by an operator and position said housing in a
 - 5 portion of the forward field of view of the operator;
 - 6 a two-axis gimbal mechanism inside said waterproof housing, said
 - 7 two-axis gimbal mechanism having a protective housing
 - 8 connected to said waterproof housing, said protective
 - 9 housing containing ring structure and two orthogonal axis
 - 10 structures;
 - 11 a magnetic field sensor module mounted on one of said axis
 - 12 structures, said magnetic field sensor module providing
 - 13 magnetic field data signals representative of the direction
 - 14 faced by the operator; and
 - 15 an optical element having a wide field of view to transmit
 - 16 compass
 - 17 data images representative of said magnetic field data
 - 18 signals to the eyes of the operator.
- 1 2.-The compass system of claim 1 wherein said mounting mechanism
- 2 transmits horizontal yawing motions of the operator to said gimbal
- 3 mechanism and said magnetic field sensor module.
- 4
- 1 3.-The modular platform of claim 2 further comprising:

2 a processor electronics module connected to said magnetic field
3 sensor module to receive said magnetic field data signals,
4 said processor electronics module reading said magnetic
5 field data signals and creating representative driving
6 signals; and
7 a microdisplay connected to said processor electronics module for
8 displaying said driving signals.

1 4.-The compass system of claim 3 further comprising:

2 a display light inside of said waterproof housing radiating
3 light through said microdisplay, said optical element being
4 aligned to receive illumination from said microdisplay and
5 transmit said compass data images for viewing by the
6 operator.

1 5.-The compass system of claim 4 wherein said display light can
2 radiate
3 light onto said microdisplay and transmit said compass data images for
4 viewing by the operator.

1 6.-The compass system of claim 5 further comprising:

2 an optically clear shim on said optical element next to a view
3 port on said headgear to prevent obscuration from the
4 environment from blocking the optical path of said compass
5 data images.

1 7.-The compass system of claim 6 further comprising:
2 a battery for supplying electrical power in said waterproof
3 housing; and
4 a switch in said protective housing having a push-button
5 extending
6 through said waterproof housing, said push button connecting
7 said processor electronics module to said battery to turn-on
8 said compass system.

1 8.-The compass system of claim 7 wherein light intensity of said
2 display light and said compass data image can be adjusted by pushing
3 said push button of said switch in a predetermined sequence.
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1 9.-The compass system of claim 8 wherein said magnetic field sensor
2 module is calibrated to account for local, static, magnetic field
3 variations by inputting sequences to said processor electronics module
4 via said push button of said switch.

1 10.-The compass system of claim 9 wherein said push button of said
2 switch can turn off said processor electronics module after a period
3 of time when no significant motion of magnetic field sensor module is
4 determined.

1 11-The compass system of claim 10 further comprising:

2 a counterweight connected to the bottom of said magnetic field
3 sensor module; and
4 a fluid filling said protective housing around said magnetic
5 field sensor module.

1 12.-The compass system of claim 11 wherein said counterweight hangs on
2 rigid attachment from said magnetic field sensor module to help keep
3 it level and prevent oscillations by the operator's pitching and
4 rolling motions, and said fluid dampens movement of said magnetic
5 field sensor module to allow the operator a wide range of pitch and
6 roll motion without degrading the accuracy of said magnetic field
7 sensor module.

1 13.-A head mounted compass system comprising:
2 means for providing a waterproof housing;
3 means for engaging a headgear worn by an operator, said engaging
4 means being mounted on said waterproof housing providing
5 means to hold said housing in a portion of the forward field
6 of view of the operator;
7 means for securing a two-axis gimbal mechanism inside said
8 waterproof housing providing means, said two-axis gimbal
9 mechanism creating means having a protective housing
10 connected to said waterproof housing providing means, said
11 protective housing containing ring structure and two
12 orthogonal axis structures;

1 a means for sensing magnetic fields mounted on one of said axis
2 structures, said magnetic field sensing means providing
3 magnetic field data signals representative of the direction
4 faced by the operator; and
5 means for transmitting compass data images representative of said
6 magnetic field data signals to the eyes of the operator,
7 said transmitting means having a wide field of view to
8 transmit said compass data images.

1 14.-The compass system of claim 13 wherein said protective housing is
2 connected to said waterproof housing providing means and said
3 waterproof housing providing means is coupled to said headgear by said
4 engaging means to transmit horizontal yawing motions of the operator
5 to said two-axis gimbal mechanism creating means and said magnetic
6 field sensing means.

1 15.-A method of sensing direction faced by an operator comprising the
2 steps of:

3 providing a waterproof housing;
4 engaging a headgear worn by an operator by a mounting mechanism

5 on

6 said waterproof housing to position said housing in a
7 portion of the forward field of view of the operator;
8 securing a two-axis gimbal mechanism inside said waterproof
9 housing, said two-axis gimbal mechanism having a protective
10 housing connected to said waterproof housing, said

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1 protective housing containing ring structure and two
2 orthogonal axis structures;
3 sensing magnetic fields representative of the direction faced by
4 the operator by a magnetic field sensor module mounted on
5 one of said axis structures, said magnetic field sensor
6 module providing magnetic field data signals representative
7 of the direction faced by the operator; and
8 transmitting compass data images representative of said magnetic
9 field data signals to the eyes of the operator, said compass
10 data images being over a wide field of view.

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